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ABSTRACT

The United Kingdom must invest in a comprehensive system of post-18 education that is broadly inclusive and that offers a broad range of educational opportunities to meet the needs of both the increasing numbers of 16-year-olds choosing to pursue postsecondary education and the many older individuals needing additional education throughout their adult lives. Creating the required spectrum of post-18 learning will necessitate the following actions: (1) meeting the growing demand for employees capable of making their own creative responses to problems/assignments rather than relying on instructions; (2) shifting the balance of courses toward a broader education applying intellectual skills to practical issues; (3) allowing local colleges to make a greater contribution to the spectrum of post-18 learning through programs of applied learning designed in collaboration with local employers; (4) varying patterns of study to meet individual learners' circumstances and learning preferences; (5) developing policy, funding mechanisms, and quality assurance arrangements and criteria for advancement in universities that reinforce the standing of teaching and learning; (6) reflecting teaching's priority in a substantial program of research and development about modern learning; and (7) determining how the cost of higher education should be shared by government, employers, individuals, and their families. (MN)

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THE COUNCIL FOR INDUSTRY AND HIGHER EDUCATION

A Wider Spectrum of Opportunities

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"A Wider Spectrum of Opportunities" draws substantially on "Post-18 Education:- growth, change, prospect", by Alan Smithers and Pamela Robinson of the University of Manchester's Centre for Education and Employment Research. This was commissioned by the Council and is published at the same time.

In preparing this paper the Council has benefited greatly from the thinking of Michael Austin, Bahram Bekhradnia, Barbara Blake, Clive Booth, Roger Brown, Colin Campbell, John Daniel, Kenneth Dixon, Nick Everest, Sheila Forbes, Carolyn Hayman, Michael Heron, Geoffrey Holland, Cari Loder, Brian Manley, David Melville, D'Arcy Payne, Leslie Wagner, Gareth Williams.

THE COUNCIL'S PURPOSE

The Council for Industry and Higher Education is an independent body of heads of companies, universities and Colleges. Established in 1986, its aim is to encourage industry and higher education to work together and represent joint thinking to government.

UK industry needs to be part of a more highly and broadly educated nation at every level. Its future success depends on responding creatively to continually more sophisticated surroundings, not only in building its workforces but also in identifying markets, developing its products, structuring its own organisations, training its people, or defining its responsibilities to the community at large.

To meet global competition and innovate imaginatively employers need to draw on the richest possible variety of educated and trainable people. The future, however, will differ from the past in that *most* jobs for the 'highly' educated will *not* be top jobs, nor in the stream of 'management'. Many young and older peoples' degrees, diplomas, or certificates will be needed to fit them to handle change in vital professional or technical, but generally more modest, roles. Graduates must be helped to understand that. British industry has traditionally been stronger in leadership, which our education has successfully fostered, than technical support.

Only a very varied pattern of new and old universities, in alliance with other higher education and local Colleges, can offer the range of opportunities needed not only for conventional students but for part-timers, adult and employed students, those with competing commitments and limited time, those whose employment may move them from place to place, who have poor educational preparation, who want professional updating or a broad liberal education, or who aspire to higher degrees or short diploma courses.

We do not think that universities exist nowadays only for economic ends. On the contrary, one purpose of our economic efforts, corporate and individual, is to provide good scope for scholars, scientists, thinkers, artists and writers: to enable them to speculate, to argue, to develop our culture and to pursue other activities valued as ends in themselves. All those activities contribute to the richness of students' education.

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SUMMARY

The UK needs to invest in a system of post-18 education, broadly seen as inclusive rather than exclusive. We need a range of education opportunities, going considerably wider than what is now defined as 'higher' education, that can extend quite quickly to the large majority of over-eighteens with a great variety of older adults, often employed, alongside them.

Not all the talent available will be developed best by diluted versions of fairly traditional academic work and much effort is needed to design and build new forms of learning, not to replace, but to complement the older ones.

The Council hopes to see more broad general education, emphasising the applications of intellectual skills to practical issues.

Seven elements of a strategy for a comprehensive higher education are summarised in Section 2 and elaborated in the rest of the paper.

1. A WIDER SPECTRUM OF OPPORTUNITIES

1.1 ***The UK must continue to widen the number and variety of education opportunities for young adults to cater for the large majority of oncoming generations. Many older people will also need to study at different stages of their lives. Keenness to learn is a national asset which industry hopes to see fostered. Those who volunteer to continue their education ought as a matter of principle to be encouraged, not least those whose particular strengths lie in the application of knowledge.***

1.2 Demand for universities reflects the proportion of young people who think it worthwhile to continue their education beyond the age of 16. Until the beginning of the 1980s most British people ended their full-time education as soon as the law allowed them at the age of 16.

1.3 The 16-year-old 'staying-on' rate has risen sharply over fifteen years. In 1980 only 27 per cent of pupils reached their second sixth-form year which could qualify them for university; by 1994 that proportion had doubled to more than 58 per cent. In short, many more pupils volunteer for education beyond age 16 and a shrinking proportion drop out at 17.

From élite to *popular*

1.4 To continue beyond the age of 18 into higher education at university or polytechnic used to be for only a small minority (one in eight in 1980); rapid expansion in recent years means that the small minority has become a large one. In the mid-90s about one 18-year-old in three will go on to higher education and a further 10 per cent in their early 20s.

1.5 Expansion, temporarily constrained by government policy, ought to keep pace with demand from those who can be expected to benefit usefully from post-eighteen education. The pool of young people qualified to apply to universities is planned to expand by 2000 from the present one-third to at least a half of the 18-year-old age group. Government and employers are already discussing whether to raise that 50 per cent target to a higher one of 66 per cent. A growth in employment opportunities might do something to restrain growth but is unlikely to change the trend.

1.6 Others return to education later in life, many to gain a new professional standing in their careers. 'Mature'-student numbers could grow rather more slowly as opportunities for young entry increase but Professor Alan Smithers and Dr Pamela Robinson believe that *as things stand now, nearly six in ten of today's 18 year-olds can reasonably expect to enter higher education sooner or later.* Those are welcome statistics. Academics, employers, and national thinking have yet to catch up with the universities' transition within a decade from being élite to being *popular.*

1.7 With each phase of expansion the range of talent widens in the new cohorts of recruits. Their circumstances vary much more. Already the

universities, their populations, courses and styles, vary far more than is generally imagined.

Variety

1.8 Quadrupling the number of universities since 1960 and nearly doubling it since 1990 has opened university education to a much wider variety of people. Women have progressed to near parity, the universities are somewhat less dominated by the sons and daughters of the professional and managerial classes, and more people are going to university later in life. More students are embarking on higher education without A-levels, more are working towards diplomas instead of degrees. *Only a minority of all entrants are under 21.*

1.9 The UK now needs to invest in a system of post-eighteen education broadly seen as inclusive rather than exclusive. We need a range of education opportunities that can extend quite quickly to the large majority of over-18s with a great variety of older adults, often employed, alongside them.

1.10 The UK has belatedly achieved the position where the roles we traditionally think of as 'professional jobs', including (for example) nursing, are now generally filled by holders of degrees or higher diplomas. Correspondingly a degree is seen as the ordinary passport to society's middle-to-upper echelons. The prospective variety of the well qualified is welcome to employers.

A professional workforce

1.11 A new challenge, however, is already urgent. The more thoughtful employers are now expecting to extend the idea of 'professionalism' with appropriate variations throughout their workforces. They look for employees not only at the top, but in almost all roles, to be educated to reflect critically on what they do, change it to meet new circumstances, and take personal responsibility for continually improving method or product. (They point to the potential that they see for extending the scope and importance of apparently modest roles.)

1.12 To compete in the global marketplace the UK economy must rely primarily on translating human brainpower into advanced processes and high added-value in goods and services. This means that trained minds are needed to inject creativity, analytical ability and inventiveness across whole organisations. The UK needs to plan a spectrum of post-eighteen education wide and diverse enough to offer a preparation for professional life first to the middle ranks, and later to the large majority, of the future workforce.

1.13 The range of people we have in mind will quickly become far wider than the universities have so far expected to teach. That means that along with more, and less, traditional degree courses, new forms of education will be needed. Not all the talent available will be developed best by diluted versions of fairly traditional academic work.

Applied education

1.14 Much imaginative effort is needed now to develop new forms of learning not to replace, but to complement, the older ones. To

convince students of the worthwhileness of rigorous study, they will generally need to be organised around areas of the working world's concerns and ways of doing things. To appeal to more practical minds they will often need to be grounded, we expect, in actual tasks and projects, in the concrete and the here-and-now rather than in the speculative or abstract. Above all such an applied education *must* offer a breadth that encourages versatility for a changing world and widens the range of choices students are equipped to make.

1.15 It may be that not all the new education needed will conveniently fit within current definitions of 'higher' education. Other countries traditionally draw those definitions more widely. The objective is to enable students to develop as far as they can and courses should be judged by 'value-added', the progress they enable students to make. We are inclined to agree with Professor Hermann Bondi's suggestion that 'higher' education be distinguished not so much by the intellectual levels at which students start and finish as by the steepness of the slope between them.

1.16 A comprehensive spectrum of post-18 education will need to be offered at reasonable cost. It must, however, preserve the central key element of personal attention by teacher to pupil which remains at the heart of education. That attention, we believe, is critical to building the confidence which underlies the general personal and intellectual capabilities which employers so much value as 'core skills'. Confidence will be the more critical for young people who have to sell their own capabilities in a flexible labour market.

An architecture of learning

1.17 To free university lecturers for their properly human tasks of teaching suggests quite radical re-analysis and re-construction of the series of processes through which people learn. Such a new architecture of mass learning is essential if major investment in hardware and software is to be cost-effective and improve university education rather than spoil it.

1.18 To achieve the new education we envisage means encouraging universities and Colleges in new directions. As well as competing, they will need a lead to collaborate so as to achieve major economies of scale. They will need, of course, to be responsive to the demands of students and to understand the working world for which their graduates are being prepared. But we think that some firm steering from the centre (by official funding bodies, for example) will continue to be needed to ensure that the UK finances a really diverse pattern of work rather than some weak sub-academic brew.

1.19 This paper proposes seven elements of a strategy for a comprehensive higher education.

2. THE REQUIREMENTS OF A STRATEGY

2.1 To create the spectrum of learning we envisage means a commitment to clear thinking and decision on seven fronts:

2.2 Growing demand for post-eighteen education from those who can benefit ought in the medium-term to be met. ***Employers will recruit highly educated people for a much wider variety of roles throughout organisations*** and judge them by their ability to make their own creative responses instead of relying on instructions.

2.3 Across the spectrum as a whole, and within many institutions, the balance of courses should shift considerably further towards a ***broader education applying intellectual skills to practical issues.*** Much of that will have an occupational context.

2.4 ***Many local Colleges (until recently occupied mainly with lower-level further education) will contribute to the spectrum of post-eighteen learning.*** Some may need guidance to make a high quality contribution distinctively their own: applied learning designed, with the collaboration of local employers, to attract and build the confidence of local people.

2.5 ***Patterns of study should be varied widely*** to meet the circumstances and learning preferences of individuals. Three and four year courses will continue to have their place among a plurality of choices, but there need be no presumption that they will remain the preferred model. Shorter full-time study coupled with part-time learning on the job may be better for many.

2.6 Policy, funding mechanisms, quality-assurance arrangements and criteria for advancement in universities, should combine to reinforce the ***standing of teaching and learning*** among the objectives universities are funded to achieve. This we see as a priority. Industry above all values well-educated people.

2.7 Teaching's priority should be reflected in ***a substantial programme of research and development about modern learning.*** Deep understanding of how individuals learn, the potential of new learning techniques, and the radical re-thinking of higher education's traditional processes, will be the proper justification for the essential major investment in modern hardware and software.

2.8 The logic of realistic commitment to expansion, diversity, high quality and rapid change is for government to promote open debate soon about education priorities and on ***how the cost of higher education ought to be shared.*** Investment must be defined and expectations for annual outlays made clear. Government, employers, individuals and their families all have parts to play.

3. EMBRACING APPLIED EDUCATION

3.1 The range of abilities and aspirations of so many learners will be much wider than British post-18 education has expected to cater for. In future only a minority seem likely to get the best from an exclusively academic style and pattern of learning. To complement high quality discipline-based courses (where the UK must continue to excel), industry hopes to see broadening education developed with a more applied bias in its style and related in its content to the foreseen elements of the working world.

3.2 It will be important to build quite rapidly on the work-related tradition of the Colleges of Further Education and the ex-polytechnics.

3.3 By the century's end as many as half the new young students will *already have chosen* during their sixth-form years an education route *explicitly applied* in style and broadly occupational in focus.

Vocational qualifications

3.4 The National Targets for Education and Training imply that more than half the young people who reach university entrance standard in 2000 will be armed *not* with A-levels but, instead, with their newly developing counterpart, the so-called General National Vocational Qualifications (GNVQs). GNVQs have been introduced precisely to provide a form of applied education complementary to the academic mode of education which has hitherto been overpowering.

3.5 The missing and vital stream of applied education, so important to employers and national competitiveness, has begun to flow through new sixth-form syllabuses towards 'vocational A-levels', as GNVQs are now known. Take-up by some 75,000 young people within two years of their launching is evidence of the gap they can be expected to fill.

3.6 Many, perhaps most, of that new stream of eighteen-year-olds will expect to continue in education alongside their fellows with discipline-based A-levels. On the other hand they will be unprepared (deliberately so) for degree courses of conventional academic pattern and style. Rather than looking towards 'academic honours', many will need to look towards a wide choice of other sorts of learning.

Broad, general education

3.7 The overall variety of opportunities needs to be as wide as possible. To achieve that means enlarging the range in favour of broad, general education which is rooted in the applied rather than the pure; its approach to theory will typically derive from practical engagement with objects, operations and projects. The scope of study will be defined, though broadly, by the concerns, actual or foreseen, of the working world. Students would learn to draw appropriately on a mixture of disciplines with their banks of accessible information to help them define and solve problems.

3.8 Already university lecturers complain that as schools (and Colleges) have given more emphasis to developing pupils' general skills, so they

find many of their new students less well equipped intellectually for specialised university work. The 'vocational A-levels' could exacerbate the difficulty unless post-eighteen courses are designed to build on them. UK universities' remarkable success in producing graduates quickly, cheaply and with few drop-outs has traditionally depended on a continuity of style and pace in young people's learning throughout their education from 16 onwards. That efficiency must be guarded.

3.9 The Council finds its own thinking in line with that of Lord Robbins's Committee on Higher Education, which confirmed the policy for university expansion in the 1960s. The *first* objective of a 'properly balanced system', they said, was 'instruction in skills suitable to play a part in the general distribution of labour'; the *second* was to 'promote the general powers of the mind'. To achieve the second *through* the first is the emphasis we hope to see (as did Robbins) particularly in the aims of a new more practical post-eighteen education.

3.10 Employers hope that the universities will review the practical/theoretical balance in their approach across the spectrum of their traditional courses as well. Large and discriminating employers of new science graduates, for example, now find many new graduate recruits to be poorly trained in laboratory craft, the daily skills of a researcher. They feel that those skills ought to be part of every scientist's basic equipment.

Employers' criteria

3.11 In recruiting for jobs at all levels, company recruiters will continue to assess graduates for a range of general personal and intellectual skills, especially for their 'communication' abilities to *explain things clearly* to working colleagues both inside their own technical disciplines and outside. Employers will expect the graduates to be at home in a world rich in information sources and the technology to go with them. They will increasingly expect their employees to contribute to teamwork. All such abilities, we think, must now become part of the definition of an 'educated person' whatever their discipline. It would be even better if universities could also find means to assess innovation and creativity in students.

Quality: Setting objectives

3.12 Those charged with overseeing the quality of publicly-funded higher education, who may in due course include the National Council for Vocational Qualifications, should seek employers' views not only on the skills they immediately need but on the long-term demands of employment, including flexibility and adaptability, which students must be prepared to meet. Quality criteria should be explicitly included which have to do with English language competence and presentation, foreign languages, numeracy, data-appreciation, team-work, tackling unfamiliar problems, and preparation for life-long learning. Those concepts are elaborated below.

3.13 Language. For most employees (and especially those beyond the most junior professional levels), competence in their own language - speaking, listening, writing, reading - determines their range of action and the precision of their thinking, as well as their ability to present material and explain themselves. Language competence helps the

more technically educated to keep up on the promotion ladder with their peers from other disciplines. Judges of higher education's quality should insist on that across the whole range of courses.

3.14 **Numeracy.** Most disciplines now have a quantitative aspect through which all students should gain the confidence to reason with, and extract information accurately from, numbers. Arts graduates in particular, whose education employers value as an excellent groundwork for further professional training, often have to be rejected because they cannot handle quantitative material.

3.15 Everyday working language now includes mathematical concepts and terms. It is encouraging that more pupils now include mathematics among mixed A-level subjects but the quantitative aspect of British education may still need strengthening. Universities which claim to prepare students for their future careers could usefully demand higher mathematic standards as a minimum entry requirement and/or offer remedial courses to bring new entrants up to scratch. Many graduates would benefit greatly from that when looking for their first jobs.

3.16 **Foreign language.** We think universities should consider insisting that all their new graduates have at least a basic competence in a foreign, usually European, language. Some students will need to start almost at the beginning, others to be given opportunities to practise and build on skills already learnt.

3.17 **Data-appreciation.** Graduates will contribute best to industry in future if they are experienced in selecting what is relevant and drawing conclusions from complex arrays of data. This is the special habit of mind demanded by an 'information society' which is more pervasive and deep-rooted than the phrase 'IT skills'z may suggest. Students' intellectual diet should be rich in data-appreciation. Quality judgements in nearly all subjects should reflect that.

3.18 **Teamwork.** It is as members of *teams* that most recruits to industry and commerce from any discipline must expect to find their feet and have their capabilities judged. As the base for action the outcomes of team-thinking are fast replacing instructions from 'above' disseminated through a many-tiered management structure.

3.19 Teams draw on qualities in their numbers that the processes of education reinforce or inhibit. Team members are chosen to make their individual contribution to intellectual debate: interactive and collaborative styles of learning in higher education are, therefore, central to developing an active, as against a submissive, intelligence. Students should be discouraged from expecting to be told what to do.

3.20 **Problem-solving:** Solving problems is a characteristic challenge for graduates in industry. It is usually quite unlike the activity of solving a given equation. It is rather to do with identifying practical issues from muddled information and seeking practical means of addressing them. The personal quality in special demand is a sort of mental initiative-taking, often of special value in proposing a team approach. It suggests an experience of higher education based in opportunities for discovery rather than absorption of predigested information.

3.21 **Inspiration:** The content of courses and the way they are taught must be chosen *above all* so as to inspire students with a passionate inquisitiveness to continue learning through life. Learning and enthusiasm for learning are bound together. Learning is an attitude, perhaps implying a set of skills, that can itself be learnt and taught.

Resist narrowness, widen choices

3.22 Employers will need thoughtful and senior representatives to make their voice heard in the philosophical debate on the design of an additional broad spectrum of learning in a more applied style. They must above all resist any narrow vocationalism or any temptation to constrict learning to a range of defined tasks. Technical and organisational change is too fast and unforeseeable for that. Employers must insist that applied higher education should offer a broad and sound base that will widen, and not narrow, the range of choices in life and work that their students are enabled to make.

3.23 We stress that point because occupationally-directed education needs to gain a reputation for enhancing students' mobility and flexibility, and not of restricting their options. Its 'graduates' need to be securely grounded and adaptable to find, or make, their opportunities at work. They must, above all, be equipped and keen to continue their learning.

3.24 The Government's official engine for encouraging vocational and applied education is the National Council for Vocational Qualifications. This has spent much of its life so far in devising vocabularies of standards for vocational training. A new imagination, broader and different thinking will be needed if that Council is to help in the new task of constructing a relevant modern education for up to half the population between the ages of 16 and 25. The new education must aim for a real richness of its own which the fashionable language of 'competencies' for all its strengths does not express at all adequately.

Joint debate

3.25 The source of imagination and new thinking can only be *a joint debate of employers with educators*. For vocational skill training (a very different matter) the practice has been to invite groupings of employers on their own ('Sector Lead Bodies') to specify requirements of particular working roles and then to translate those quite directly into objectives for teachers and instructors. Such a procedure has proved too simplistic for specifying new sorts of college education or for setting the tone and guidelines for 'vocational A-level' courses.

3.26 We should expect much from newer arrangements for employers and educators to exchange thinking around the same table: "What may the changing future demands of the working world be like?" "How can formal learning best equip young and older people to meet them?" "How can the requirements of professional lives be understood so as to guide students' choices towards an education that is coherent rather than piecemeal?"

3.27 The combined insight of employers and educators should allow academic and practical emphases in education to be increasingly intertwined. That will be the strongest reason for bringing together the training and education responsibilities of the government

Departments of Education and of Employment. At present the two Departments can sometimes be seen to signal opposed education approaches: the one narrowly specific (Employment), the other over-academic (Education). Occupationally-directed and skills-based education need the same respectability and the same policy-home as their traditional academic counterpart. Students at every level need different mixtures of both.

4. BRINGING IN THE COLLEGES

4.1 To offer the full range of post-18 places we envisage, the local Colleges of Further Education will need to play a special and properly acknowledged part. Already some 12 per cent of higher education students begin their courses in the Colleges; some complete them there, others at universities. We should not be surprised if over the next decade Colleges come to match their Scottish counterparts in taking as many as one student in four for some part of their courses.

4.2 Employers may continue to look to well-known universities for their future leaders and top professionals but they will be able to recruit some of their highly qualified workforces, with diplomas or degrees, from several hundred Colleges as well as from a hundred universities.

A distinctive role

4.3 It is precisely in developing practically-based, occupationally-relevant learning that the best Colleges, and some departments of the new universities, are most fitted by their traditions to play a special part. They are already among the leaders in making sound learning to uncompromising standards accessible and convenient for the individual needs of a remarkable range of local people. Colleges are good at making advanced education into an everyday business, at building confidence and allaying older people's fears that work may be beyond them.

4.4 The Colleges contribute specially to the first national aim of educating the *whole* workforce with their tradition of attracting working people to higher education. Although over 40 per cent of higher education students now come from the 'clerical and working-class' social groups, those groups are still seriously under-represented. Recent research at Anglia Polytechnic University suggests that more would venture on courses, if they were offered in familiar surroundings close to home and, also, for many of them, clearly related to local work opportunities.

4.5 It is their particular style of teaching, convenience of access, openness, vocational tradition, unsnobbishness, and general engagement with the everyday that can justify giving Colleges a bigger place in higher education. Correspondingly, government and funding agencies should steer the Colleges to resist actively any temptation to adopt the style or aura of the older universities. That would be a route not to respectability but towards irrelevance.

Employer connection

4.6 In developing Higher Education with strong local application Colleges ought to have the advantage of strong connections with local employers. That is part of their business.

4.7 With the ending of older schemes which sent apprentices 'to College' once a week, College connections with employers have generally become less lively than they will need to be. The Council hopes, (as we said in our 1993 paper "Changing Colleges") to see College/employer interaction revitalised. With the Further Education

Funding Council we have commissioned research to suggest what sort of policies from government and its agencies, employers and Colleges, might best encourage that.

4.8 Employers and their staff will be customers of the Colleges for re-skilling and professional updating. Colleges are dispersed throughout the UK and only they are close enough at hand to most employers for the large-scale provision of education opportunities to the whole of their workforces. High levels of 'lifelong learning' ought to provide a big market for them.

4.9 It will be important to develop the strong links that already exist in many areas between the Colleges and their neighbouring universities. A clustering of the Colleges in a region around, say, one or two universities seems a promising development. It could give capable students scope to progress to very high levels and would allow the most specialised teaching facilities to be economically used. Such co-operative clusters could take a lead in strategic planning to meet the full range of a region's needs.

5. GOING ON LEARNING

5.1 Once universities, Colleges, employers and individuals make a reality of continuous learning (an enormous and vital challenge), new decisions can be more sensibly made about how much students need to learn at the start of their working lives (ie. in full-time continuous courses) and how much they can learn later as it becomes relevant to them.

5.2 The conventional three-years unbroken degree course will not be the best pattern for everyone. Shorter initial periods of full-time study coupled with continued learning on the job may suit many learners and employers better. Those setting their sights on high intellectual distinction or on advanced and specialised professional practice will on the other hand often need extended courses.

Three purposes

5.3 The early stages of post-18 education might then be seen to have three purposes. To acquaint young people with the basics, (as it were the 'grammar' of a subject or of several), to suggest to them how and where their capacities may be applied (not least in the immediate job market), and to give them the enthusiasm to go on learning.

5.4 The Council's director has recently referred to 'the false dilemma of whether students should be taught broadly for the long-term or given the well focused skills to do an immediate job'.

> "Of course," he suggested, "students must be offered the broadest practicable understanding of the world they will live in through the eyes and the language of the disciplines they choose. But equally, to command their first wage in the market place, they need to be able to *do* something.
>
> Two years of learning the basics, plus a year of equipping yourself for some immediate use, could have something to commend it for some. Sometimes a final year's-worth of education might be split between two or three part-time years by employed students whose studies might reflect their everyday work."

5.5 That option, however, attractive as it could be to many older students especially, is not suggested as a norm. Many, probably most, young students need the clear three years of study they now get to mature and develop the breadth and general skills they need.

5.6 Employers might come to offer provisional contracts to such potential graduates as, so to speak, higher apprentices. They could continue to assess them as potential long-term recruits.

Useful and up-to-date

5.7 Flexibility could be of special value to students wanting to spend much of their university time on non-technical studies, especially in the humanities disciplines. Degrees in English literature, history or philosophy, for example, as the Council has said, can be an excellent

foundation for further training, but should no longer be counted on to provide a direct ticket to management traineeships. Such students might welcome the chance to spend (say) part of a final year on more explicitly professional preparation.

5.8 Our own studies of the use and development by employers of science and engineering graduates show clearly the head-start enjoyed by those whose education included experience at work. A big pharmaceutical group, recently surveying the experience of its own graduate employees, has confirmed the same point.

Reflective practitioners

5.9 Common-sense suggests that many students learn best out of their own experience at work and their own efforts to solve its problems. The Council has learnt with interest of the Harvard Medical School's 'New Pathways' programme which has reversed the traditional order of study by putting new students not into the classroom but straight into the clinic on the job.

5.10 The ideal of 'reflective practitioners', educated constantly to review their own work, revise their own methods, and develop theory out of experience, seems to stand precisely for a sort of higher education the Council is keen to see encouraged.

5.11 Employers will correspondingly expect to recruit well qualified people at many levels and at different stages of their education. It will be helpful for students to be able to show evidence of achievement and often formal credit for each block of study. The traditional ritual of 'graduate recruitment' will be the channel for only a minority.

6. THE CREATIVITY OF TEACHING

6.1 We cannot emphasise too strongly that among universities' outputs, it is well taught, broadly grounded, appropriately skilled *people* that industry values most, and ahead of any research output. Industry looks to university laboratories, for example, first of all for properly trained and thoughtful researchers. It sees technology as being transferred in the heads of well-educated graduates who can apply their knowledge systematically. It looks for people taught to develop understanding by reflecting on experience.

6.2 To achieve the new spread of post-18 education effectively and efficiently, while raising its quality, implies something of a revolution in learning methods in which the UK is well-placed to lead the world. Academics need every incentive to focus their creativity on teaching and recognise the 'management of learning' as their first concern.

6.3 The gearing of public funding to competitive assessment of research performance has not helped to encourage innovative teaching; rather it has been an incentive to multiply research publications across the sector, though many already successful research departments are excellent at teaching too. The Council is encouraged to learn from some vice-chancellors that the new 'assessments of teaching quality' have encouraged staff to review their teaching critically.

6.4 The Council hopes that from now on universities, their agencies and government will seek to sharpen all the incentives to good teaching and ensure that in every university it can be rewarded with appropriate pay and recognition. We are glad to learn of proposals to earmark some central grants to keep lecturers abreast of good practice in teaching and the management of learning. They are no more than a first step that needs pursuing with determination: many of us feel that all academic staff need opportunities for initial and refresher courses for a demanding job which is changing fast. Teaching 'core skills', on which CBI puts much stress, will set new challenges.

6.5 The Research Councils, responsible for setting priorities for public research funding, will need to consider how far improved education and training is actually associated with the research programmes they choose to finance. National bodies representing the major academic disciplines could be encouraged to re-think the relative emphases they give to education and to research, and how one may inform the other.

Re-thinking processes

6.6 In future more students must learn with (relatively) fewer staff, more efficiently and to higher standards. The students will be more widely dispersed and will begin their studies from a wider spread of starting-points. Yet the universities have already increased productivity to a level believed to be near the limits of *present education processes*. The scale of expanded activity is already putting strains on academics as they struggle increasingly to accommodate growing numbers by methods some of which are still recognisably medieval.

6.7 Industrial experience suggests that steep changes in productivity always mean fundamental re-thinking of processes. There are already thinkers in universities and, particularly, in local Colleges, who have begun to analyze in detail the implications of aiming deliberately to improve learning with much higher ratios of students to staff. They are concerned to relieve lecturers of (for example) the burden of simply transmitting information, to investigate how students can manage their own learning, to build on the UK's experience of 'distance learning', to experiment with carefully structured learning materials, and to improve efficiency by professional diagnosis of individuals' needs, prior knowledge, experience and aspirations.

6.8 Such experiments promise big increases in productivity and better learning at the same time. Above all they free lecturers for their proper and distinctively human activity of encouraging, advising, checking, criticising, praising and assessing progress of their students. That personal attention is probably inseparable from building the confidence that will enable people to turn their knowledge to account in unfamiliar and changing circumstances at work.

6.9 Radical re-thinking of method will change the nature of the academic job. Industrial experience suggests that it will pervade universities and Colleges. *Such re-thinking of 'process' needs to be the essential precondition for the sector's investing intelligently and quite heavily in electronic and software techniques on a large scale.* (We are reminded that the Open University, once seen as the offspring of broadcasting technology, turns out in practice to owe its success much more to the close analysis of how adults can learn, and the arrangement of knowledge, materials, tuition and support systems to match. Television has come to be seen as no more than one, and far from the most important, of 'delivery mechanisms'.)

Collaboration

6.10 The initial investment in the design of learning programmes, software and hardware will, we suspect, seem prohibitively expensive unless made with the prospect of intensive and widespread use. In short, lecturers spread across many institutions will need to agree on programmes, and perhaps whole courses, which almost all students of a subject could use in common. Consortia in a few disciplines are already experimenting; there need to be more.

6.11 Such close collaboration and even some loss of absolute independence by rival institutions could build on academics' own loyalty to their academic disciplines. The national learned bodies representing the disciplines might respond constructively to the challenge of leading the redesign of teaching and learning, in partnership with employers, once offered the incentive of prospective investment in related research, software and equipment.

6.12 In technical and professional fields employers will need to contribute much more of their best long-range thinking about the capabilities students can expect to need for the future working world. They must help in defining the bodies of knowledge, often running across several disciplines, and the more general skills, which will best equip people for future areas of technical challenge.

6.13 We think that the prospect of learning arrangements that are better as well as cheaper will justify major national investment in five or ten years of mission-oriented research and development. Its returns would be measured not only in reduced costs per student, but in more confident, because more personally educated, graduates, and above all perhaps, in the more productive use of academic creativity and professional skill.

'Technology-assisted'

6.14 The Higher Education Funding Council for England already finances some initiatives in 'technology-assisted learning'. These should be seen as part of a more ambitious drive to innovation in the 'management of learning' across higher education as a whole. The priority is not to push out the boundaries of electronic technique but to achieve deep understanding of learning possibilities with systems most of which already exist.

6.15 More needs to be known about how people learn, about what sort of learning materials and techniques prove effective and about what sorts of configuration of hardware and software can be the most effective vehicle. Experience and innovation elsewhere in the world, particularly in the United States, can be drawn on.

6.16 The sustained intellectual effort to achieve these major innovations should be a field of strategic and applied research where many of the new (and some of the older) universities can find leading roles. The work we have outlined offers the chance to major teaching-oriented institutions to develop a much enhanced 'scholarship of teaching' and build international reputations.

6.17 The priority of such a research and development programme needs to be judged against the broad spectrum of public investment, and not only against present funding allocations for higher education or the science base. Nonetheless the programme we have in mind will precisely meet the newly-set national criteria for publicly-funded research, namely that it show potential to contribute, usually in the longer run, to 'wealth creation' and 'the quality of life'. Better learning will contribute powerfully to the UK's long-term competitiveness.

A worldwide market

6.18 The UK has important advantages in pursuing such an innovation. It is already a leader in the world-wide market for academic expertise particularly in Europe, Commonwealth countries and elsewhere in the Far East. Our text books and learning materials are widely used, our academics visit, the UK standards are current, the universities are multiplying their own outposts and English is the preferred second language. In the longer term returns from overseas alone should give valuable additional payback on the investment we are suggesting. There will soon be other competitors which is another reason for advancing quite fast.

6.19 The UK is also lucky in having the Open University's experience to draw on. We hope that no misplaced competitive spirit will prevent other universities sharing its valuable expertise.

6.20 Recent heavy investment in networks of 'information highways' make

this a particularly favourable time to develop new and modern styles of learning. Delivery networks will be in place and competing fiercely for volume traffic by offering attractive financial terms.

6.21 The innovations will provide a challenging field to which to recruit new staff for universities and Colleges. In ten years many should be attracted to doing what should by then be a rather different job. They should have the prospect of teaching coupled with investigation both into advanced understanding of learning and into the demands of the working world where knowledge will have to be applied.

7. PAYING FOR IT

7.1 To combine expansion, greater efficiency, improved quality, and a change of product range is a classic business challenge. It demands from government, first, a realistic financing strategy and, secondly, a commitment to capital investment in change. Investment in transition to a different kind of system is well justified. Without it we risk a down-at-heel system, outmoded teaching arrangements, failing to attract good teaching staff and discouraging new students. If quality slips, it will be hard to restore.

7.2 Universities' efficiency has increased rapidly over the last ten years. The immediate scope, if any, for further such increases is now, and rightly, a vexed question. Over the next year both universities themselves and government need urgently to find more robust and sensitive means of judging appropriate cost levels for higher education. This is less a question of monitoring the financial health of universities and Colleges - which is generally sound with a few exceptions - than of assessing the appropriate and affordable depth and variety of students' whole education experience.

7.3 In the longer run there ought to be a shift in public spending in favour of education as a whole, but we do not necessarily expect higher education to be a regular beneficiary of it. The claims of schools, and particularly the education of 16-to-19-year-olds, take priority. (The best guarantee of the quality and quantity of future entrants to higher education will be to widen the range of courses open to 16-year-olds and the number that take them.)

7.4 In the next few years, however, there will be some exceptional costs of transition to a new pattern of university activities. They must be justified by prospective returns in terms of greater efficiency, higher throughput, and improved intellectual quality of the population and the workforce.

7.5 In recent years higher education institutions have learnt to cover a growing proportion of their total spending from sources other than the publicly-funded block grant and tuition fees. Such additional income, however, will continue to go mainly to cover either research (to which charities and industry contribute increasingly) or the additional costs of offering other services - above all continuing education - which are largely extraneous to the mainstream teaching of full-time students.

The company role

7.6 Companies are keen to play an appropriate role, but, as the Council has said, they are customers for services and connections they need, not mainstream financiers. Of the £350m that they are estimated to have spent in 1990 on higher education less than a third contributed in practice to the general cost of mainstream teaching and research. That is as it should be.

7.7 Company-paid fees for continuing education, for retraining and updating can certainly become fast-growing sources of institutional

income and even a growing proportion of it. But fees for such courses will go mostly to cover the added cost of providing them. They do little to help undergraduate teaching or fundamental research which are the background of higher education's cost structure.

Individual contributions

7.8 Expansion of opportunities and investment in quality are the proper context for debating openly whether, and how, to increase the proportion of individuals who contribute to the cost of their own education. A realistic funding strategy is essential and none is possible without that debate. We continue to think that it could be beneficial for individuals to become financially engaged with their own higher education. More than four students in every ten already pay fees, Open University students, all part-timers, and many post-graduates.

7.9 The distinctions between those different modes of study are beginning to fade as education is seen as a continuing business intertwined with working life. There is no national case for discriminating against older people or part-timers. Indeed part-timers deserve encouragement, since the majority are able to support themselves while they study.

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